National Weather Service
Building a Weather-Ready Nation

What Does a Mild December Tell us About the Rest of Winter?

The December of 2011 looks as if it will go down as one of the top 20 warmest Decembers on record in Des Moines. With the warm temperatures, snowfall has also been well below average. As of December 28th, Des Moines had only received 2.0 inches of snowfall for the month. Therefore, winter has gotten off to a warm and relatively snow-free start, but what does that tell us for the rest of the winter?

Temperature: Below are all of the Decembers in which the monthly average temperature was 31 degrees or higher. The chart shows how the rest of the winter months' temperatures faired, with the final column showing cumulative data for December through March. Red colors indicate temperatures above the mean and blue colors indicate temperatures below the mean (**Note:** The means used are the 1878-2011 means, not the new 1981-2010 climate normals).

Year	December Average Temperature	January Average Temperature/ Departure from Mean (1878-2011)	February Average Temperature/ Departure from Mean (1878-2011)	March Average Temperature/ Departure from Mean (1878-2011)	Dec.-Mar. Average Temperature/ Departure from Mean (1878-2011)
2011	31.8 (as of 12/28)	?	?	?	?
2006-2007	34.7	23.6 | +2.8	18.7 | -6.4	45.2 | +8.3	30.9 | +3.7
2002-2003	31.4	21.1 | +0.3	21.8 | -3.3	37.5 | +0.6	28.1 | +0.9
2001-2002	32.4	31.0 | +10.2	32.0 | +6.9	34.4 | -2.5	32.5 | +5.3
1982-1983	31.6	27.3 | +6.5	32.3 | +7.2	39.3 | +2.4	32.7 | +5.5
1979-1980	31.5	23.4 | +2.6	21.2 | -3.9	34.6 | -2.3	27.8 | +0.6
1965-1966	35.2	14.2 | -6.6	24.7 | -0.4	41.0 | +4.1	28.9 | +1.7
1959-1960	33.8	21.1 | +0.3	19.4 | -5.7	21.4 | -15.5	24.0 | -3.2
1957-1958	31.9	24.8 | +4.0	16.8 | -8.3	34.7 | -2.2	27.3 | +0.1
1946-1947	31.0	26.6 | +5.8	18.1 | -7.0	32.3 | -4.6	27.2 | 0
1941-1942	32.8	22.1 | +1.3	23.6 | -1.5	38.7 | -1.8	29.4 | +2.2
1939-1940	33.4	9.0 | -11.8	24.6 | -0.5	33.1 | -3.8	25.0 | -2.2
1931-1932	35.8	24.5 | +3.7	31.9 | +6.8	30.4 | -6.5	30.6 | +3.4
1923-1924	35.8	17.1 | -3.7	27.2 | +2.1	33.2 | -3.7	28.3 | +1.1
1918-1919	34.3	29.8 | +9.0	26.5 | +1.4	39.0 | +2.1	32.5 | +5.3
1913-1914	34.0	29.6 | +8.8	19.7 | -5.4	37.3 | +0.8	30.4 | +3.2
1912-1913	31.7	23.5 | +2.7	22.4 | -2.7	34.4 | -2.5	28.1 | +0.9
1907-1908	31.1	27.1 | +6.3	26.1 | +1.0	39.8 | +2.9	31.1 | +3.9
1896-1897	34.0	19.5 | -1.3	26.9 | +1.8	34.7 | -2.2	28.9 | +1.7
1894-1895	32.6	16.7 | -4.1	19.4 | -5.7	35.9 | -1.0	26.3 | -0.9
1891-1892	34.6	18.1 | -2.7	29.1 | +4.0	33.6 | -3.3	28.9 | +1.7
1890-1891	32.3	28.3 | +7.5	23.2 | -1.9	28.8 | -8.1	28.3 | +1.1
1889-1890	39.5	20.7 | -0.1	26.9 | +1.8	29.7 | -7.2	29.2 | +2.0
1881-1882	34.9	26.2 | +5.4	36.3 | +11.2	37.5 | +0.6	33.6 | +6.4

The first thing that becomes apparent from the above chart is that a warm December does not necessarily mean the rest of the winter will be warm. It seems there is some correlation between warm Decembers transitioning to warm Januarys, but this is obviously due to their close temporal proximity, and the chance that the same general weather pattern in December is affecting at least the first part of January. Moving into February and March, there is much less of a correlation, with 13 of 24 Februarys and 15 of 24 Marchs having had temperatures that were below normal. The winter season as a whole ended with temperatures above normal in 20 of the 24 years. Since December started off so warm in each of these years, the only way the seasonal temperatures could drop below average was to have temperatures well below normal in the remaining winter months (ex: 1959-1960, 1939-1940, 1894-1895).

Snowfall: It has been shown that warm temperatures in January do not necessarily transition throughout the rest of the winter, but what about snowfall? As of December 28th, Des Moines had only received 2.0 inches of snow for the month, with no additional snow expected. The chart below lists all Decembers since 1885 that have received 2.0 inches or less of snowfall. The columns show how snowfall faired the rest of the winter months (Snowfall is in inches).

Year	December Snow	January Snow/ Departure from Mean (1885-2010)	February Snow/ Departure from Mean (1885-2010)	March Snow/ Departure from Mean (1885-2010)	Dec.-Mar. Snow/ Departure from Mean (1885-2010)
2011	2.0 (as of 12/28)	?	?	?	?
2006-2007	1.1	11.5 | +3.3	14.4 | +7.2	7.9 | +2.4	34.9 | +7.0
2004-2005	1.1	10.1 | +1.9	6.3 | -0.9	1.2 | -4.3	18.7 | -9.2
2002-2003	0.1	4.7 | -3.5	14.4 | +7.2	5.3 | -0.2	24.5 | -3.4
2001-2002	1.0	9.1 | +0.9	0.9 | -6.3	6.8 | +1.3	17.8 | -10.1
1993-1994	2.0	8.8 | +0.6	15.2 | +8.0	0.5 | -5.0	26.5 | -1.4
1991-1992	1.2	1.9 | -6.3	4.5 | -2.7	0.2 | -5.3	7.8 | -20.1
1988-1989	1.0	0.1 | -8.1	16.3 | +9.1	1.2 | -4.3	18.6 | -9.3
1979-1980	0.4	7.9 | -0.3	5.7 | -1.5	5.8 | +0.3	19.8 | -8.1
1975-1976	0.5	2.4 | -5.8	11.8 | +4.6	0.9 | -4.6	15.6 | -12.3
1970-1971	1.4	15.9 | +7.7	13.7 | +6.5	5.3 | -0.2	36.3 | +8.4
1949-1950	1.9	5.5 | -2.7	15.3 | +8.1	8.1 | +2.6	30.8 | +2.9
1947-1948	1.0	1.7 | -6.5	6.7 | -0.5	18.8 | +13.3	28.2 | +0.3
1943-1944	1.5	1.4 | -6.8	4.6 | -2.6	13.0 | +7.5	20.5 | -7.4
1933-1934	0.8	8.0 | -0.2	4.8 | -2.4	6.2 | +0.7	19.8 | -8.1
1930-1931	2.0	8.6 | +0.4	T | +7.2	6.9 | +1.4	17.5 | -10.4
1928-1929	1.6	21.4 | +13.2	19.1 | +11.9	0.7 | -4.8	42.8 | +14.9
1926-1927	1.0	2.3 | -5.9	5.6 | -1.6	0.9 | -4.6	9.8 | -18.1
1922-1923	1.9	7.8 | -0.4	2.7 | -4.5	25.3 | +19.8	37.7 | +9.8
1921-1922	1.6	3.2 | -5.0	0.4 | -6.8	2.7 | -2.8	7.9 | -20.0
1913-1914	1.5	6.8 | -1.4	14.8 | +7.6	2.0 | -3.5	25.1 | -2.8
1912-1913	0.6	16.1 | +7.9	6.7 | -0.5	6.7 | +1.2	30.1 | +2.2
1906-1907	0.6	5.3 | -2.9	5.3 | -1.9	3.6 | -1.9	14.8 | -13.1
1903-1904	1.6	5.0 | -3.2	3.5 | -3.7	4.5 | -1.0	14.6 | -13.3
1896-1897	0.9	13.9 | +5.7	8.1 | +0.9	6.1 | +0.6	29.0 | +1.1
1890-1891	1.0	4.0 | -4.2	6.0 | -1.2	17.5 | +12.0	28.5 | +0.6
1889-1890	0.1	17.4 | +9.2	12.0 | +4.8	5.7 | +0.2	35.2 | +7.3

As was the case with temperatures, there is very little correlation between December snowfall and snowfall the rest of the winter. Looking at the data, 16 of the 26 years saw the below average snowfall continue into January. Only 14 of the 26 and 13 of the 26 came in below average in February and March, respectively. Despite a very dry start (2 inches or less in December), 10 of the 26 years still came in with above average snowfall for the winter season. Therefore, it seems as if December offers us little, if any forecasting power for the remainder of the winter. Some people think that winter tends to make up for a slow start, hammering central Iowa more in February and March. While this is obviously not always the case, there have been quite a few examples where February and March have really brought a healthy dose of snow (Feb 2003, Feb 1994, Feb 1950, Feb 1929, Mar 1948, Mar 1923, Mar 1891).

El Nino/La Nina Correspondence

Many recent studies have shown that sea surface temperature anomalies in the tropical Pacific Ocean have a distinct impact on the global weather pattern. The El Nino/La Nina Southern Oscillation (ENSO) is an index that is used to quantify these temperature anomalies and classify whether the pattern is in a neutral, El Nino (warm), or La Nina (cold) phase. Currently, we are in a La Nina phase which is expected to last through the remainder of the winter season. Although this index does quite well in predicting global circulations, it can be tough to correlate to the weather at one specific location such as central Iowa (**Note:** ENSO data only goes back to 1950).

Temperature: The following chart shows the years where December average temperature was greater than or equal to 31.0 degrees. The ENSO phase is noted.

Winter	ENSO Phase	Winter	ENSO Phase
2006-2007	Neutral	1979-1980	El Nino
2002-2003	Neutral	1965-1966	La Nina
2001-2002	La Nina	1959-1960	Neutral
1982-1983	Neutral	1957-1958	La Nina

Not surprisingly, there seems to be little correlation to warm Decembers and any ENSO phase. 4 of the 8 years actually occurred in a neutral ENSO phase, showing there is no strong signal between the ENSO index and December temperature.

Snowfall: The same chart was created for snowfall. The winters that contain Decembers where Des Moines received 2.0 or less of snowfall are listed. The ENSO phase is noted.

Winter	ENSO Phase	Winter	ENSO Phase
2006-2007	Neutral	1991-1992	Neutral
2004-2005	Neutral	1988-1989	El Nino
2002-2003	Neutral	1979-1980	Neutral
2001-2002	La Nina	1975-1976	La Nina

As with temperature, there is little correlation between light December snowfall and ENSO phase. 5 of the 8 years occurred in a neutral phase, with 2 of the other 3 occurring in La Nina years.

It's important to remember that our skill in predicting seasonal temperatures is very limited and many factors that cannot be anticipated beyond a week or two often play major roles in the predominant weather patterns. The charts above simply show what has happened in the past, and as shown above, have little predictability on what will happen the rest of the winter. For a forecast for the remainder of this winter, refer to the latest 30 and 90 day outlooks from the Climate Prediction Center.